AI Planning
Exercise Sheet 10
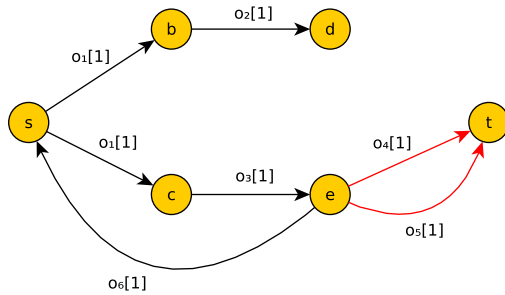
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Exercise 10.1

Iteration i=1

prop p	s	b	c	d	e	t
$h_{max}^{c_i}(p)$	0	1	1	2	2	3

action o	o_1	o_2	o_3	o_4	o_5	o_6
pcf $D_i(o)$	s	b	c	e	e	e

G_i :

$V_i^* = \{t\}$
$V_i^0 = \{s, b, c, d, e\}$
$V_i^b = \{\}$
$L_i = \{o_4, o_5\}$
$h_{\text{LM-cut}}(I)$ so far $= 1$

Iteration i=2

prop p	s	b	c	d	e	t
$h_{max}^{c_i}(p)$	0	1	1	2	2	2

action o	o_1	o_2	o_3	o_4	o_5	o_6
pcf $D_i(o)$	s	b	c	e	e	e

G_i :
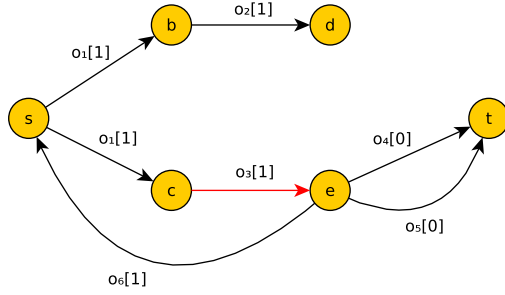
$V_i^* = \{t, e\}$
$V_i^0 = \{s, b, c, d\}$
$V_i^b = \{\}$
$L_i = \{o_3\}$
$h_{\text{LM-cut}}(I)$ so far $= 2$

Iteration i=3

prop p	s	b	c	d	e	t
$h_{max}^{c_i}(p)$	0	1	1	2	1	1

action o	o_1	o_2	o_3	o_4	o_5	o_6
pcf $D_i(o)$	s	b	c	e	e	e

G_i :
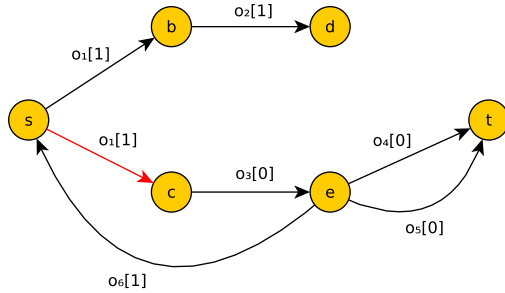
$V_i^* = \{t, e, c\}$
$V_i^0 = \{s, b, d\}$
$V_i^b = \{\}$
$L_i = \{o_1\}$
$h_{\text{LM-cut}}(I)$ so far $= 3$

Iteration i=4

This is when $h_{max}^{c_i}(t) = 0$. The task states not to give the pcf, G_i, etc. for this iteration.

$h_{\text{LM-cut}}(I) = 3$

Exercise 10.2

(a) The transition system for a planning task Π shows all possible (as in reachable from I) combinations of variable values (nodes) connected through edges that represent operators leading from one set of variable values to another. By abstracting Π to one variable v the transition system is reduced to only represent changes in the value of v. Edges still represent possible transitions achieved through the application of operators. Possible values of a variable plus possible transitions is exactly what a DTG is.

(b)
$act\_o := \emptyset$
generate transition system for $\Pi|_v$ for every $v \in V$
for all $o \in O$:
    $act := 1$
    for all $v \in prevars(o)$:
        if there is no path from $s(v)$ to $pre(o)(v)$ in $\Pi|_v$:
            $act := 0$
        if v is goal-related and there is no path from $pre(o)(v)$ to $\gamma(v)$ in $\Pi|_v$:
            $act := 0$
    for all $v \in effvars(o)$:
        if v is goal-related and there is no path from $eff(o)(v)$ to $\gamma(v)$ in $\Pi|_v$:
            $act := 0$
    if $act == 1$:
        $act\_o.push(o)$